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THE HORN SPEAKER

THE NEWPAPER FOR THE HOBBYIST OF VINTAGE ELECTRONICS AND SOUND

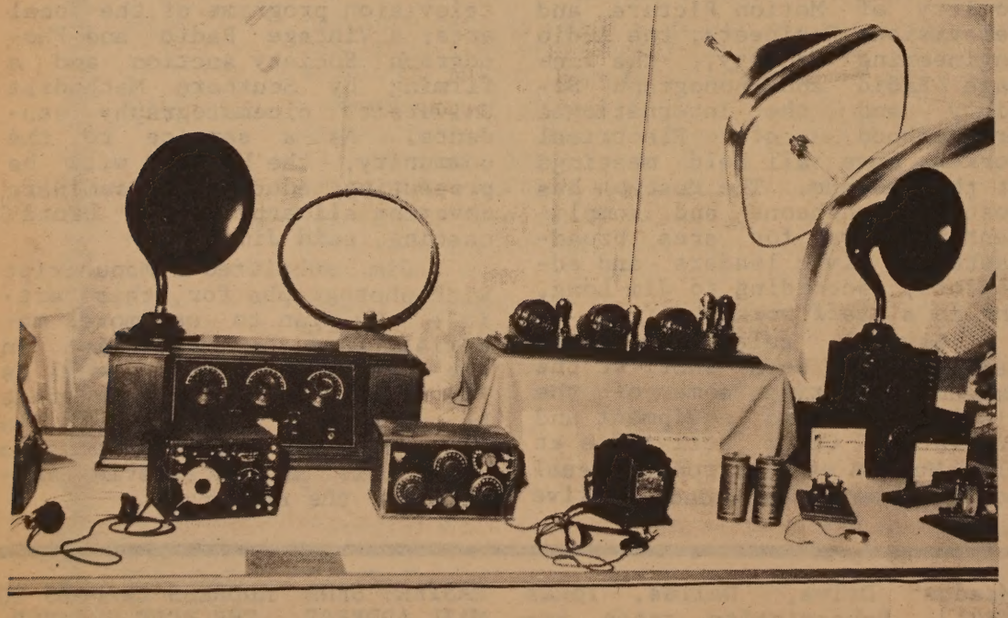
National Broadcast Museum

Edited by Janet James

Not only can the visitor to The National Broadcast Museum see all the vintage radios, broadcasting equipment and phonographs in displays of sound history, but, there, at the museum can be seen such things as Bill Haley's and Buddy Holly's guitars, Walter Cronkite's microphone used on last appearance on CBS Evening News, Ed Asners (of Lou Grant fame) wristwatch worn on that show, Thomas Edison's personal microscope and even a pair of Ronald McDonald's shoes.

Before recently changing its name to The National Broadcast Museum, it was known as The Texas Broadast Museum, which opened on May 16, 1981. The Museum is still located at the corner of Ross and Market Streets in downtown Dallas' West End Historical District.

A progressive display of phonographs to represent a wide variety of styles.



A mixed group of radios with one of the famous Atwater Kent "breadboard" radios just right of center

The hard working people behind this Museum consider it to be the world's largest permanent collection of broadcasting artifacts. More than 100,000 pieces of vintage equipment, printed and transcribed materials and memorabilia document a century of technical evolution in communication.

The National Broadcast Museum has its early roots in the dirt scratching efforts of Billy and Jennie Bragg, who started an operation of this size with only $25.00. They are now seeing their hard work and dreams turn into a reality.

The Museum contains examples of phonographs, radio and television sets and commercial radio and television broadcasting equipment, plus miscellaneous items and memorabilia from the late 1800s to the 1960s. More than fifty phonographs, ranging from 1898-1960 are on display

A country store exhibit done in a likeness of the Lum and Abner, "Jot "em down store."

chronicling the development of that medium from the first primitive machines to the sophisticated turntables of the present. Examples from Edison, Victor, Columbia, Brunswick and many others are shown including some rare and unusual pieces.

The visitor can select old radio programs from a card file and then listen to them on authentic antique radios in the Museum's listening booths. The Museum's vast collection of records, news tapes and tehnical journals that are being cataloged and will be available as reference material for serious researchers.

In addition to providing an eduational atmosphere, the Museum also serves as a meeting place for various groups and provides facilities for other functions. The International Television Association, the Society of Motion Picture and Television Engineers, the Audio Engineering Society,, the Vintage Radio and Phonograph Society and the International Brotherhood of Electrical Workers have all held meetings at the Museum. The Museum has hosted luncheons and complimentary tours for area broadcasters, civic leaders and educators, according to Jim Long, who is a staff worker.

Several television commerials have been shot at the Museum utilizing some of the displays and old equipment and artifacts. Other activities at this Museum of electronic visual history have included a live broadcast by KFJZ Radio; several visits by PM Magazine and Four Country Reporter, both are television programs of the local area; a Vintage Radio and Phonograph Society auction and a filming by Southern Methodist University cinematography students. As a service to the community, the Museum will be presenting educational seminars covering all aspects of broadcasting, said Jim Long.

Jim submitted a manuscript with photographs for this article. We plan to use more material from the manuscript in the September issue as well as the remaining photographs that he sent us. "Thank You, Jim Long, for all you have done to make this an interesting article for the readers."

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What Everyone Should Know About Radio History

By PROF. J. H. MORECROFT

PART II

A FEW years after the publication of Hertz's work in 1888 the scientific world heard rumors of the experiments of Guglielmo Marconi, then about 20 years old. He had been a student of Physics under Professor Rosa, at the Leghorn Technical School, and had especially made himself acquainted with the work of Professor Righi, who had been making experiments similar to those of Hertz, extending Hertz's work into the region of very short electric waves, about one centimeter long.

MARCONI'S METHODS

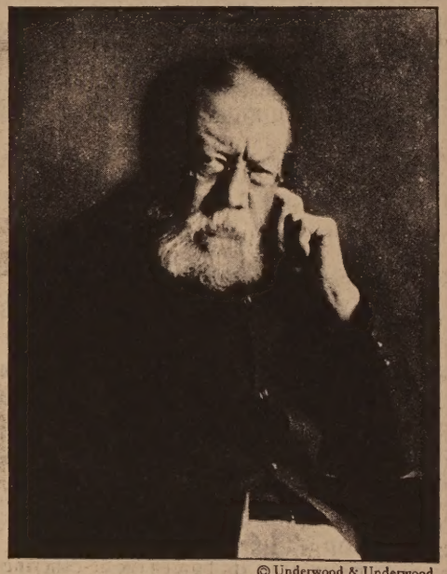
MANY contributions to scientific development have been the result of accident; something strange and unexpected has happened in the course of an experiment and has thus started a keen mind in search of its significance. But not so with Marconi; it is evident in reading of his early experiments and progress that he had set out, intentionally and with premeditation, to develop the laboratory work of Hertz into a successful scheme of communication. And once having started on the problem he stuck to it with a persistence seldom seen in a scientific worker. His progress was methodical, and followed the line suggested by his experimentation; there are no wonderful jumps in the methods of attacking the problem or in the results achieved. The development brought out by Marconi from 1895 to 1902 is an excellent example of scientific attack and accomplishment; with keen insight as to what was happening, Marconi took the logical steps to increase the distance over which he could carry on signalling and also the certainty of the communication.

His enthusiasm and ability steered him clear of the thorny and tedious path which must be trod by many inventors; the British Post Office Department and many prominent scientists gave him assistance and encouragement in carrying out his tests. It was in England that Marconi found the conditions best suited to the development of his new scheme of telegraphy; the British Empire has always been foremost in the development of communications as it is evidently of utmost importance for the close coöperation of its component parts. Until the United States entered the field of world-wide radio the British cables practically controlled the field of international communication. This of course gave to her traders a great advantage over others and enabled them nearly to control world trading. It is no wonder therefore that Marconi was so ably assisted in his development work in England. Its success would give the British Dominions still better control over the world's trade routes.

As everyone at all acquainted with radio knows, it involves the generation and radiation of high frequency waves at the transmitting station and some means of detecting them at the receiving station. Marconi started by using at his transmitting station radiators similar to Hertz's, but used at his receiving station a more sensitive indicator than was used by Hertz—a device known as the Branly coherer. The coherer, in the form first used by Marconi, was a small piece of glass tubing with metal terminals in each end, the space between these ends being filled with metallic filings, loosely in contact. It possessed a remarkable property by virtue of which if high frequency voltages were impressed on its terminals the contacts between its particles of metal dust became much more intimate so that the electrical resistance of the device became much less. This effect could be taken advantage of in the scheme of Marconi very well; a battery connected through the coherer could ordinarily force but little current through it because of its high resistance, but when it was affected by the high frequency waves sent out by the transmitting station its resistance fell to a low value and thus the battery could send much more current through it and so ring a bell or operate a printing telegraph, etc. This coherer of Branly, which was considerably improved by Marconi, was probably the most important single factor in Marconi's early work, it so far exceeded in sensitiveness Hertz's spark-gap receiver that it increased the possible distance of communication hundreds of times.

EFFECT OF HEIGHT AND SIZE OF ANTENNA

EARLY in his work Marconi got the idea of using at his transmitter and receiver a vertical wire, to the upper end of which was connected some large metallic body (such as a tin-covered cubical frame) and the lower end of which was connected to metal plates laid on the ground. He found that with his vertical wires six feet high he could communicate one hundred feet and with them twelve feet high he could get the same amount of signal at a distance of three hundred feet, and when they were twenty-four feet high he got the same signal strength at twelve hundred feet. Furthermore with his twenty-four foot wires—, if he increased the size of the metal bodies connected to the upper end, the possible distance was very much increased; thus with metal cubes about three feet on a side his transmission distance was three times as much as when they were only one foot on a side. These experiments, which were carried out in 1895, it will be noted, gave to Marconi ideas regarding the effeciency of an antenna as a radiator or receiver which we accept as correct to-day after much more refined measurements of the quantities involved. If an antenna is to send out much power, it must be high, and, further, it must have a large spread of wires at the top and be suitably connected to good earth plates, or ground, as we call it.



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SIR WILLIAM H. PREECE

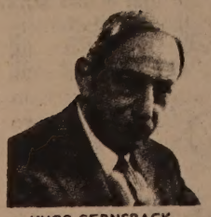
In 1896 Marconi went to England with his apparatus and there took out his first patent on wireless telegraphy in that year. His work interested Sir William Preece, of the British Government telegraph service; this eminent engineer at once realized the wonderful advance Marconi had made over previous attempts along this line, and gave to the young inventor his hearty support and approval. Although Marconi made no startling new invention he had availed himself of the known possibilities of Hertzian waves and had improved the Branly coherer and had made a combination which worked. When the validity of Marconi's claim to an invention was questioned Sir William Preece made the following comment:

"He has not discovered any new rays; his receiver is based on Branly's coherer. Columbus did not invent the egg but he showed how to make it stand on end, and Marconi has produced from known means a new electric eye more delicate than any known electrical instrument and a new system of telegraphy that will reach places hitherto inaccessible. Enough has been done to prove and show that for shipping and lighthouse purposes it will be a great and valuable acquisition."

Sir William's belief in the usefulness of the young inventor's scheme has been amply justified, as we now know; in fact, his estimate of the value of Marconi's work was all too small.

From 1896 on Marconi gave many demonstrations, gradually increasing the size of his apparatus and correspondingly the distance over which he could communicate. In 1898 a set was in actual operation connecting the Goodwin Sands lightship with the shore; with the success thus far reached it was evidently only a matter of perseverance and material resources to accomplish transoceanic communication, the goal towards which many of the earlier experimenters, dealing with currents in the ocean water, had striven with no success.

In 1899 he had in operation two stations



HUGO GERNSBACK
PIONEER PUBLISHER

GUGLIELMO MARCONI
SENT FIRST WIRELESS
MESSAGE 1896

bridging the English Channel, and during the month of December, 1901, the first transatlantic signals were received by him in Newfoundland. For these first transoceanic tests his receiving aerial in Newfoundland was a wire supported by a kite, and the transmitting aerial, in Cornwall, on the west coast of England, was two hundred feet long and one hundred and sixty feet high. The spark transmitter used in Cornwall had an electrical capacity of only about 10 kilowatts and its efficiency must have been extremely low. In judging the ability required of Marconi in getting these first messages it must be remembered that to-day, with much more efficient transmitting sets, and receiving circuits thousands of times as sensitive as was Marconi's coherer, we use hundreds of kilowatts of power to get reliable transoceanic communication. The success of Marconi's first transoceanic tests speaks volumes therefore for his experimental ability. Bold indeed would be the experimenter to-day who would attempt transoceanic signalling with an inefficient spark coil transmitter, and a coherer for a receiver!

TUNING OF TRANSMITTER AND RECEIVER

THE waves used in the early experiments were not much more than "splashes" in the ether (whatever that mysterious substance may be); the receiving apparatus could not be tuned, and the great gain in loudness of signals which tuning makes possible could not be obtained. Pupin, in America, had pointed out the possibility of using tuned circuits at low frequency, and from 1899 to 1901 Marconi did much experimental work in trying to use tuning (or syntonizing, as it was then called) and took out several British patents on the application of tuned circuits to wireless communication.

He accomplished a great deal, using two tuned circuits, loosely coupled at the transmitting station and two similarly arranged circuits at the receiving station. The arrangement of circuits he used in 1900 was as good as that we use to-day in a modern spark transmitting set; of course there are certain features which have been improved since then, such as the quenched spark gap, and the crystal detector or vacuum tube detector, at the receiving station. We must remember that in all this important development work of Marconi's he was using as detector the coherer, which, although Preece regarded it as the most sensitive electrical eye possible, was but a very crude and insensitive piece of apparatus compared to that we use at present. It had to be continually tapped by a buzzer attachment to maintain it in a sensitive condition; after a signal had been received through the coherer the dust particles were cohered, and had to be shaken apart by the taps of the buzzer before they could again function to receive another signal.

PRACTICAL TRANS-ATLANTIC COMMUNICATION

IN 1907 the company developing Marconi's work opened the well known stations at Clifden, in Ireland, and Glace Bay, in Nova Scotia. Regular commercial business was carried on at the rate of ten cents a word. This Clifden-Glace Bay service was the pioneer radio link between America and Europe and much very valuable data was gained during the first few years of its operation. In spite of its novelty and isolation in the technical field (for years no other radio transmission rivalled it), the service was surprisingly uniform and reliable. It was in the study of the operation of this service that Marconi first found out that it was very difficult for a radio signal to cross the sunrise or sunset line; when the sun had risen in Ireland but had not yet come up in Glace Bay the sunrise line was somewhere in the Atlantic and the signals had to cross this line. A remarkable fading effect in the strength of signals was noted; in fact transmission across the line was practically impossible. We still have to contend with strange fading phenomena in radio transmission, but this special sunrise seems to occur to an appreciable extent only for the comparatively short waves used in the early days. Now, with waves 20,000 meters long, the effect is of much less importance. It was in the operation of this Clifden-Glace Bay service that the tremendous difference between transmission in the summer and that in the winter was forcibly brought out. The interference by atmospheric disturbances is thousands of times as troublesome during the summer as in the winter months, so that the amount of power required for summer traffic must be many times as great to get the same reliability in transmission as in the winter months.

Many of the amateurs will recall the consistent transmission of the low pitched musical note of Glace Bay; it used to be the station by which we could test the condition of our sets, regularly sending its dots and dashes across the ocean. The Clifden station was not as easy to "get," of course, as was Glace Bay but many of the good amateur experimenters used to do it, nevertheless.

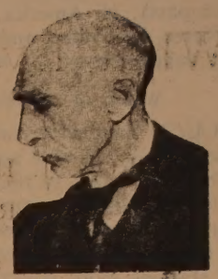
OF COURSE, work as remarkable as was that of young Marconi excited the interest of every scientific and technical man of the day and many of them contributed valuable ideas to the rapid development of the new art. In England Fleming was closely associated with Marconi, and was undoubtedly of great assistance in the early experiments helping to design properly the circuits and apparatus. Later he contributed the Fleming valve about which more is said later on. Lodge and Muirhead made important contributions and were granted various patents, particularly with regard to the coherer, which was unquestionably the weakest point in Marconi's whole scheme. This coherer, which occupied the same position in the receiving circuit as does the crystal or tube detector of to-day, with its buzzer for de-cohering after every dot, was rather complicated and unsatisfactory in its performance, and many of the workers endeavored to modify it so as to improve its performance. With the simple crystal detector of to-day, or the vacuum tube, the work of the early experimenters would have progressed much faster and farther.

© Paul Thompson

JOHN STONE STONE

MARCONI'S WORK TAKEN UP IN GERMANY

WORD of Marconi's work having reached Germany, Professor A. Slaby came to England in 1897 to see the experiments. He himself had been trying to use the ideas of his illustrious countryman, Hertz, to obtain communication over appreciable distances, and had met with but meager success. Slaby was quick to recognize the superiority of Marconi's work over his own and gave him generous praise after seeing but a few of his experiments. In analyzing Marconi's work, Slaby (who afterwards became one of the foremost wireless inventors of Germany) replied to some of the criticism which had been raised against the novelty of Marconi's work in the following words: "It was urged that the production of Hertz rays, their radiation through space, the construction of the electrical eye*—all this was known before. True; all this had been known to me also, and yet I was never able to exceed one hundred meters.



DR. J. A. FLEMING
FLEMING VALVE 1905

HEINRICH HERTZ
ELECTROMAGNETIC WAVES
1887

"In the first place Marconi has worked out a clever arrangement for his apparatus which by the use of the simplest means produces a sure technical result. Then he has shown that such telegraphy (writing from afar) was to be made possible only through, on the one hand, earth connection between the apparatus, and, on the other hand, the use of long extended upright wires. By this simple, but extraordinarily effective, method he raised the power of radiation in the electric forces a hundred fold."

After witnessing Marconi's experiments and returning to Germany, Slaby began active development of wireless along the lines already taken by Marconi, and, associated with Count von Arco, developed the well known Slaby-Arco wireless apparatus. Professors Braun and Zenneck made valuable contributions also to the German wireless development. In 1903 Slaby and von Arco and Braun joined interests with the *Allgemeine Electricitäts Gesellschaft* and Siemens and Halske to found the *Gesellschaft für Drahtlose Telegraphie*, which firm put out the excellent wireless apparatus used in the "Telefunken" system.

To the scientific and theoretical side of radio Drude, Abraham, Wien, and Seibt, in Germany contributed; in France Poincaré, Branly, and Ferrie; in Italy, besides Righi there were Bellini and Tosi (who did the pioneer work in the

*By which was meant the coherer.

radio compass); in America, Pupin, Trowbridge, Pierce, Fessenden, and Stone helped in the early developments.

WORK OF FLEMING

ALTHOUGH there were many engineers and scientists of valuable assistance to Marconi in his early work, of these J. A. Fleming was by far the most important, judging by the contributions he made. Fleming assisted in making the generating apparatus at the transmitting stations more powerful and reliable, using an alternating current generator and transformer in place of the spark coil used earlier by Marconi. His great contribution to the art was not along these lines, however, but in furnishing a more reliable and sensitive detector of the high frequency radio currents set up in the receiving aerial. The coherer, and later the magnetic detector, had been used by Marconi; the magnetic detector was more reliable than the coherer but even this was far less useful than the Fleming valve, the forerunner of the wonderful vacuum tube used to-day in all good sets.

In 1883 Thomas A. Edison had noticed a peculiar action taking place in some of the special incandescent lamps with which he was working at the time. Experiments carried out with a bulb in which there had been sealed a metal plate close by the filament but insulated therefrom, showed that if the metal plate was made electrically positive with respect to the filament, current could pass through the vacuous space between the filament and plate, but if the plate was made negative with respect to the filament no current could flow. Here there was evidently a kind of electrical gate, or one-way valve, and the idea was patented by Edison in 1884. The phenomenon was given the name, "Edison effect."

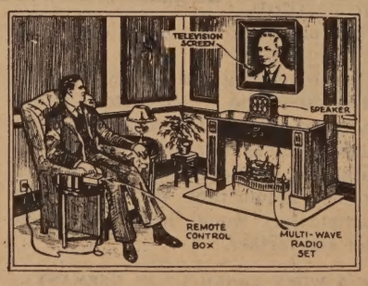
Fleming had used some of these bulbs having the extra electrode inside and when working with Marconi he got the idea of using this effect to permit the detection of the high frequency currents in a receiving aerial. Using a coil for transmitter and another for receiver, the same as Hertz had done, he utilized one of these bulbs with a direct current galvanometer in series to see if the direct current instrument would indicate. His first tests were successful and indicated that such a type of rectifier would probably be much more useful than the coherer.

Fleming took out a patent in Great Britain in 1904 and in America in 1905, the patent covering the idea of using the Edison effect in detecting high frequency signals. It has been frequently stated that Fleming did not invent this device, the well-known Fleming valve,—that his accomplishment was merely the application of an old idea in a new field. This is undoubtedly true, but such application has repeatedly been rated as invention and it has been judicially confirmed that Fleming's work did constitute an invention. The life of this patent is, of course, now expired, so that the construction of a two electrode tube for detecting radio signals is now permissible for anyone.

Marconi used some of the early Fleming oscillation valves (as Fleming called them), and found them much more satisfactory than the coherer then used. The ordinary crystal detector had not yet been discovered, so the production of the oscillation valve by Fleming constituted a real advance in the art. In sensitiveness those valves which have been tested by the writer are about equal to an ordinary crystal, but they have the advantage, of course, compared to the crystal that it is not necessary to hunt for a "good point." As long as the batteries are not run down, and the filament is hot, a valve will always function properly, whereas it cannot similarly be known for a crystal that it is operative or not, but recourse must be had to testing with locally produced signals.

Fleming apparently made a quite thorough investigation of his valves, and it is worth while noting some of his remarks regarding their behavior. He had noticed that the current flowing across the vacuous space in the valve was strongly affected by the action of either an electric or a magnetic field. The control of the electron stream by the magnetic field is the basis of the action of the "magnetron," a device developed in the General Electric Laboratory during the last year or two. The action of an electric field on the electron flow to the plate of course foreshadows the control of the plate current by an electric field applied either internally (the De Forest audion) or externally, as done in the Marconi audion, with external grid, a type of tube known to but few radio experimenters. It seems strange that Fleming did not at once jump to the idea of the audion, but the history of science is full of just such occurrences—a worker on the point of making an important discovery, yet missing it by the merest chance.

"I think I found the trouble lady—you forgot to plug it in!"



The television receiver of the near future. Remote control buttons are used to select any type of picture with its accompanying sound. A suggested layout is shown here.

February, 1932

HAPPY COLLECTING THIS SUMMER

Mailbox

Hi Jim,

Here is my check for 2 year renewal subscription.

What are the chances of using better paper- such as magazine stock instead of this newsprint? I'm sure the subscribers would be glad to pay more for a copy that they could keep on file without it yellowing and falling apart in a few years.

73
Phil Weingarten
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Forest Hills, NY
11374

Editor.. If there is a strong public demand to warrant raising the subscription price, we will be able to print on a better grade of paper. We appreciate your comment. We try to serve everyone with a low ad rate medium. However, since the hobby is now growing faster, we plan to publish a slicker publication in the future. For example, a quarterly publication with original hand drawings in pen and ink.

The following is a letter that was published in the April edition. It is republished in reference to the following letters.

Dear Jim,

A fellow collector has found several small glass bottles that are 4 1/2 inches high and 1 1/2 inches at the base. They look like the small old fashioned milk bottles.

Embossed in the glass is the signature of Thomas A. Edison. Also on the bottle are the words "Edison Battery Oil," plus the company's address.

We would like like to know

ANTIQUE RADIO & TUBE CO.

1725 W. University, Tempe, AZ 85281

602-894-9503

LITERATURE

ATWATER KENT RADIO SERVICE MANUAL. Reprint of 1927 A.K. service information. Covers models 10, 10-B, 12, 19, 20, 21, 30, 32, 33, 35, 50, "B" Power Unit, Horn type speakers and Model "E" speaker. Also explains radio theory and general trouble-shooting procedures. 7.00

ATWATER KENT RADIO PARTS LIST. Reprint of 1927 AK parts list. Shows all parts for above listed radios, plus original parices. 6.00

ANTIQUE RADIOS, RESTORATION AND PRICE GUIDE. by David and Betty Johnson. Teaches basics of radio theory, trouble shooting, and restoration of early radios. Also contains pictures of many collectable radios, and current market price guide to 1000 different sets. 10.95

COLLECTING OLD RADIOS AND CRYSTAL SETS. by Max Alth. Covers evolution of radio, components, manufacturers, repairing and collecting. Includes many photographs and pricing information. 7.95

VINTAGE RADIO 1887-1929. by Morgan E. McMahon. A pictoral story of pioneer days in wireless radio. Over 1000 pictures of 263 pages. 9.95

A FLICK OF THE SWITH 1930-1950. By Morgan E. McMahon. Picks up where the Vintage Radio book leaves off, with the year 1930, and continues into the beginnings of television. Over 1000 pictures on 312 pages. 9.95

1921-1932 RADIO COLLECTOR'S GUIDE. By Morgan E. McMahon. Lists key information on over 9000 radio receivers made by some 1,200 companies prior to 1933. Gives manufacturer, year, original price, cabinet type, and technical information. 9.95

MOST OFTEN NEEDED 1926-1938 DIAGRAMS. Reprint of Morris Beitman's Supreme Publications book, shows circuit diagrams for 600 radio models. 9.95

RCA RADIOLAS, RADIOTRONS, AND ACCESSORIES. Reprint of RCA promotional literature. 20 pages of pictures, descriptions, and original prices of mid 20's radios, speakers, tubes and accessories. 4.50

RADIO ENTERS THE HOME. Reprint of 1922 RCA publication. Excellent 128 page book filled with pictures of home scenes as well as technical shots of apparatus. 12.50

70 YEARS OF RADIO TUBES AND VALVES. A new book by John W. Stokes. A thorough history of tube development and with hundreds of excellent illustrations. 250 pages, hardcover. 21.95

THE VICTOR. Reprint of Victor Talking Machine booklet cataloging Victor I through VI and Victrola X through XVI, onotographs, horns, needles, etc. 32 pages of descriptions, pictures and original prices. 5.75

RIDER - PERPETUAL TROUBLE SHOOTER MANUALS.

VOLUME 1 - $95.00, VOLUME 2 - $70.00 VOLUMES 3 thru 5 - $20.00, VOLUMES 6 thru 15 - $7.00, VOLUMES 16 thru 19 - $10.00, VOLUMES 1-5 Abridged - $20.00.

THORDARSON POWER TRANSFORMERS FOR 1930-1950 AC RADIOS

275-0-275V 50MA., 5V. 2A, 6.3V. 2.5A half shell mtg.	No.22R01	18.95
300-0-300V 70MA., 5V. 2A, 6.3V. 3A half shell mtg.	No.22R02	28.75
250-0-250V 70MA., 5V. 2A, 6.3V. 2.5A vertical mtg.	No.24R09U	28.28
300-0-300V 90MA., 5V. 2A, 6.3V 3.5A half shell mtg.	No.22R04	23.75
260-0-260V 90MA., 5V. 2A, 6.3V. 3A vertical mtg.	No.24R13U	27.48
270-0-270V 120MA., 5V. 3A, 6.3V. 3.5A half shell mtg.	No.24R20	26.45
270-0-270V 120MA., 5V. 3A, 6.3V 3.5A vertical mtg.	No.24R20U	27.76

THORDARSON FILTER CHOKES, UNIVERSAL REPLACEMENTS

40 Ma. 8 Henries 450 ohms U bracket with leads	No.20C52	4.88
80 Ma. 12 Henries 370 ohms U bracket with leads	No.20C53	7.46
150 Ma. 8 Henries 145 ohms Vertical mtg., leads	No.20C54	15.60

AUDIO INTERSTAGE, DRIVER AND OUTPUT TRANSFORMERS

Interstage 10000 to 40000 ohms C.T. U Bracket,	Thordarson	No.20A16	9.12
Interstage, replacement for early battery sets 1:3,	Stancor	No. A-53	9.50
Driver, 7000 to 15800 ohms C.T. U Bracket,	Thordarson	No.20D89	9.12
Output, universal single or push-pull plates to voice coil 8Watts	Thordarson	No.24S06	11.78
Output, universal single or push-pull plates to voice coil 4 Watts, GC		No.D1-740	7.85

POWER SUPPLIES FOR YOUR EARLY BATTERY RADIOS

"A" SUPPLY 6 volt 3 amp, regulated. Supply up to 12 DIA's. May be adjusted 4 to 7 volts $58.00

"B" AND "C" SUPPLY, 100 MA, regulated. Taps at +135, +90, +67, +45, +22, and -3, -4.5, -9 & -22 Volts 74.00

Spec. sheet and picture sent on request.

MISCELLANEOUS

Vintage Headphones. High impedance, good condition.	$ 7.00
Six foot brown plastic line cord with molded plug and strain relief.	.95
Filter Capacitors--20 mfd, 450V. Axial leads. Sprague TVA-1709.	.95
Speakers, 8" PM, 8 ohm voice coil 12 W , Oaktron BE1A	9.08
Speakers, 10" PM 8 ohm voice coil 15W, Oaktron 10HU8	15.53
Music Box- Shaped like cathedral radio. Plays "Second Hand Rose". 5" x 4"	15.95

PARTS AND MATERIALS FROM GC ELECTRONICS

Solder--60/40 rosin core type 0.050" diameter. Self feed dispenser contains 6½ feet of solder.	No.N3-390	2.00
Rubber Feet-- ¼" diameter with self-adhesive backing. Pkg. of 16	No.16-150	1.33
Spaghetti Assortment--Insulating tubing including fiberglass, varnished, and plastic types. Sizes from No. 24 thru 3/8". 9" Lengths.	No.550	1.35
Heat Shrinkable Tubing Assortment--Assorted sizes and colors. Pkg. of 7--6" lengths.	No.N3-462	1.50
Vinyl Tape-- Finest electrical tape. UL approved, with handy cutting dispenser. 3/4" x 20 ft.	No.N3-468	1.75
Standard Solid Phone Tip--Brass, bright nickel plated solder type.	No.33-156	.16
Dial drive Cord--for radio tuners		
Standard Thin 0.028"-0.029" 25FT.	No.75-25	1.98
Medium/Heavy 0.040" 25FT.	No.74-25	1.98
Bargain Hardware Assortment--Contains 600 to 1000 nuts, washers, grommets, springs, clamps, and eyelets, in handy plastic box.	No.11-524	3.50
Spra-Kleen-- GC's most popular general purpose contact cleaner. Eliminates noise in volume, tone, and balance controls. Cleans, lubricates, and preserves. 6 oz. aerosol can. Avoid use on plastics.	No.10-8666	1.97
Jif-Action-- A general purpose electronic contact cleaner. Cleans, lubricates, and leaves protective coating. Safe for plastics, and all materials. 6 oz. aerosol can.	No.10-634	2.28
Lubriplate-- White, calcium base grease lubricant. Provides protection against corrosion. Will not oxidize or harden.	No.10-2302	2.08
Phonolube-- Light bodied grease specially developed for lubrication of small geared mechanisms, such as record changers, etc. Tube 2Fl. oz.	No.10-1223	1.75
Potentiometers- 1/4" round, 2-½" long shaft.		
5K, Audio Taper.	No.81-681	2.40
5K, Audio Taper, with switch	No.81-682	3.40
500 K, Audio Taper	No.81-688	2.40
500 K, Audio Taper, with switch	No.81-689	3.40
1 Meg., Audio Taper	No.81-691	2.40
1 Meg., Audio Taper, with switch	No.81-692	3.40
All Wave Radio Outdoor Antenna Kit-- For shortwave or long distance broadcast reception. Contains 50' aerial wire, 25' lead in wire and all necessary hardware.	No.32-145	12.95

all we can about these bottles. Never heard of "battery oil." Are they valuable?

George Friedrich
7162 Jacqueline Ln.
Custer, Wisconsin
54423

Dear Jim-

Received the April THE HORN SPEAKER and was moved to write regarding George Friedrich's letter about the Edison Battery oil bottles.

I have had one for a couple of years, acquired from an antique store in Salt Lake City. After inquiring of several "old timers" with negative results, I proceeded to do some research. The answer was found in Ghirardi's Radio Physics Course in the Batteries chapter; under the heading "Edison Nickel- Iron- Alkaline Storage Battery" was a sentence "A thin layer of white mineral oil should be placed on top of the electrolyte.... to reduce the evaporation."

Value of these bottles? That depends on the collector, of course. They make a fine conversation piece, of course. Beyond that, my appraisal would be $10-$15 each since I paid less than that for mine.

As to value would anyone in your reading audience like to submit a rough appraisal of my recently acquired, almost min, Vaseline, Blue, Glass, Art Deco, "Bluebird", Sparton 566 radio? I repaired it for a customer and told him I really liked it. After a month he called me and let me have it for $25.00 less than his best offer. Said he knew I'd appreciate it. Do I ever...

Sincerely,
Stan Lopes
1201 Monument Blvd.
Space 74
Concord, CA 94520

Dear Jim:

I had been meaning to write with an ad, but was stimulated further by the inquiry in the current issue of THE HORN SPEAKER regarding "EDison Battery Oil".

In the late '40's I was employed by the Primary Battery Division of the Thomas Edison Company in West Orange, NJ. (The division was actually located in Bellville, NJ). The market was the railroads and product was the Primary Battery, which was used in the railroad signal departments. These batteries were used to provide power to then isolated signal devices along the trackage in locations not otherwise furnished with AC.

The Primary Battery consisted of a glass jar, a ceramic cap from which the elements were suspended, the battery acid in a water diluted solution and Thomas Edison Battery Oil in a small glass container.

The purpose of the oil was to provide a floating "blanket" to reduce or even stop the evaporation of the battery solution. In that it did a fairly good job.

After WW II, rural electrification brought AC to the trackside, and although Primary Batteries may still be used in some locations, the more familiar storage battery became the signal's source of power. I don't know whether the Battery Oil is still used, but it certainly did its job in stopping electrolyte evaporation.

Ray Miller
Evergreen Press
Box 1711
Oceanside, CA
92054

IMPORTANT ANNOUNCEMENT!

ARS electronics moved!

PLEASE NOTE OUR NEW ADDRESS:

ARS ELECTRONICS
3030 PHEASANT CREEK DRIVE #402
NORTHBROOK, ILLINOIS 60062

ARS continues to offer the best in servicing information, technical books and electronic parts and equipment.

FREE CATALOG

The latest ARS catalog is now available. For your free copy please send a self addressed-stamped envelope. Or if you prefer, use the handy coupon below and enclose one 20¢ stamp.

☐-Please send me your latest catalog.

NAME_____

ADDRESS_____

P.O. BOX or RR #_____

CITY_____STATE____ZIP_____

PHONE (Optional) (___)-_____

HS-3

CLASSIFIED

AD SPACE:
Full page.....$65.00
Half page.....$35.00
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Multiple runs....20% discount

AD RATE: 10 cents per word
20¢ per word for nonsubscribers
Photo ads: $5.00 extra
DEADLINE: 20th of the preceding month
List ads - 35 cents per line

* FOR SALE *

****
SALE. NEW ORIG. CTN. 6U5/6G5 eye tubes for $15.00; New orig. 864 tubes for $7.50; New filter capacitors, old tymey style but long life oil filled at 4 mfd at 600V. Size 4 1/2" X 1 1/2" with 3/4" mounting hole. Price $2.75 or 4 for $10.00. Postage extra. OLD RADIO HOSPITAL; P.O. Box 31555; Houston, TX 77235. (713) 723-4254 after 6 p.m.
****

****
FOR SALE- CATHEDRAL, BATTERY and A.C. radios. Send SASE with two stamps. J. Albert Warren, Box 279, Waverly, PA 18471
****

(1) Battery 3 tube Colin B. Kennedy 1914 (1) Battery 3 tube Westinghouse 1907 (20) 199 tubes, new and used (3) WD12 tubes and (2) 20's Russell F. Schoen, R# 1, Box 224, Clintonville, WI 54929. (715) 823-6744.

****
FOR SALE RADIO NEWS MAG. BOUND COPIES VOL. 39-49 1948-1953, $85.00 FOR LOT. MICHAEL EDWARDS, 2122 COLONY ROAD, JAMISON, PA 18929 (215) DI3-0258.
****

FOR SALE: RADIOLA 25, RADIOLA V, RADIOLA III, PHILCO 84, Neutrowound Super 6, Many A sets. Several horn speakers. Send long SASE for complete list. Gary Hill, 1507 Ridge Avenue, New Castle, PA 16101 WANTED: Philco 118, AK cathedrals.

****
FOR SALE: DEWALD CATHEDRAL good, works $65.00, Radiola 24 $100.00, AK 60 in Keil table $85.00, Philco 70 cathedral $110.00, Zenith chairside (small) $40.00, Zenith 55127 wreck $20.00, RCA tube carton for rad 80 w/tubes. $25.00 Richard C. Foster, 12 Shawmut Avenue, Cochituate, MA 01778
****

MONTGOMERY WARD 1922 WIRELESS CATALOG reprodution, $3.00. 1965 Army Field Radio Manual, special, $2.00. Send stamp for list of old radio books. Add $1.00 Postage for books. Radiographics, Box 18492, Cleveland Heights, OH 44118.
****

"EVER TRY TO REPAIR A STATOR WINDING OF A KENT VARIOMETER WHEN IT GETS LOOSE AND STARTS TO UNRAVEL? IT IS IMPOSSIBLE. I SELL THE COILS READY TO GLUE IN PLACE. ALSO SELL STATOR SHELL AND ROTOR PARTS WITH WINDINGS." EXACT REPLACEMENTS OF CROSLEY BOOK CONDENSERS EITHER WOOD FOR OLD TIME SETS OR COMPOSITION FOR LATER MODELS.$25.00 PLUS UPS. REPLACEMENT RADIOLA 5 CRYSTAL DETECTORS.. COMPLETE UNIT .. $25.00 PLUS UPS. ROLAND MATSON, RFD NO. 1, BOX 2943, KENNEBUNK, ME 04043 (207) 985-3751
****

FOR SALE: SEND SASE FOR LIST OF 101 radios, speakers, and related items. List includes several AK breadboards. Tom Burgess, Box 9769, Little Rock, AR 72219.
****

01A's; $6EA; UX199's; $10.00 each. -- General Electric K-50-P (1933- cathedral- vg to exc- untested) $75.00 -- Federal A-10 (1925- retangular cabinet- mint- works on local stations) $80.00 -- National FB-7 (1933- metal cabinet- exc- untested) $120.00 (bottom panel and a few tube shields missing) Amplion AR-39 speaker (1925?- horn- exc- works) $130.00 -- Lots of DeForest, Coto and Branston coils. Send large 2 stamp S.A.S.E. for complete and up to date photo list. Ron Boucher, 376 Cilley Road, Manchester, NH 03103, (603) 669-1698.
****

CROSLEY TRIRDYN, WORKS, without tubes $70.00, with tubes $80.00. Crosley 5-50, works, without tubes $75.00, with tubes $90.00. Standarddyne battery set with brass panel, works, without tubes $30.00, with tubes $52.00. No answer without S.A.S.E. For list, Arthur Harrison, 1021 Falcon Drive, Columbia, MO 65201. (Shipping extra.)

PUETT ELECTRONICS

P.O. BOX 28572 DALLAS TX 75228

SEND $1.00 FOR OUR 1983 CATALOG NO. 21

ANTIQUE RADIO LITERATURE LIST --- WE NOW OFFER OVER 300 DIFFERENT ITEMS --- CATALOGS; INSTRUCTION MANUALS; FACTORY SERVICE MANUALS; TUBE MANUALS; HAM RADIO EQUIPMENT; BOOKS; OWNER'S MANUALS; "HOW TO BUILD" INSTRUCTIONS & MANUALS; TEST AND ALIGNMENT INSTRUCTIONS; TROUBLESHOOTERS DATA, BOOKS, AND MANUALS; TEST EQUIPMENT INSTRUCTION MANUALS AND SERVICE DATA; TUBE TESTER CHARTS AND TEST DATA BOOKS; ETC.

SEND THREE FIRST-CLASS-MAIL (20¢) STAMPS FOR THIS LIST (OUR CATALOG NUMBER PLL).

TRADE/PURCHASE??? --- WE ARE ALWAYS INTERESTED IN ACQUIRING NEW LITERATURE. WE WILL TRADE COPIES OF LITERATURE FROM OUR LIST OF ANTIQUE RADIO LITERATURE (PLL) OR FROM OUR LIST OF OVER 200 ITEMS OF CLASSIC RADIO LITERATURE (CATALOG NUMBER PCRL) FOR YOUR HIGH-QUALITY PHOTOCOPIES OF ANY TYPE OF ANTIQUE RADIO RELATED LITERATURE. PLEASE WRITE AND LIST ALL ITEMS WHICH YOU HAVE TO TRADE, SPECIFY THE YEAR OF PUBLICATION, THE NUMBER OF PAGES, THE NAME OF THE COMPANY OR MANUFACTURER, AND BRIEFLY DESCRIBE THE CONTENTS OF THE PIECE OF LITERATURE. IF YOU HAVE ANY ITEM WHICH WE BELIEVE WE COULD MAKE AVAILABLE TO OTHER COLLECTORS AT A PROFIT, WE WILL BE GLAD TO TRADE ANYTHING WE OFFER FOR SALE OF EQUAL VALUE. WE WILL ALSO PURCHASE COPIES OR ORIGINAL ITEMS OF LITERATURE ------- SEND US A LIST OF THE LITERATURE WHICH YOU HAVE TO OFFER. IF YOU DO NOT HAVE ACCESS TO A HIGH QUALITY PHOTOCOPY MACHINE, WE WILL BE GLAD TO MAKE OUR OWN COPY OF YOUR ORIGINALS IN MANY CASES AND STILL SEND YOU WHAT YOU SEEK IN TRADE.

SPECIAL OFFER --- OUR LIST OF CLASSIC RADIO LITERATURE (A $2.00 VALUE IN OUR CURRENT CATALOG NO. 21) -- SEND THREE 20¢ STAMPS FOR THIS LIST BEFORE 31 AUGUST 1983!!!

OLDE TYME RADIO CO.

NEED HARD TO FIND OLDE TYME RADIO PARTS SUCH AS:

*VINTAGE TUBES
*AK STYLE BATTERY CABLE
*OLDE TYME HOOKUP WIRE
*BROWN SILK TYPE POWER CORD
*AUDIO TRANSFORMERS
*POWER TRANSFORMERS
*HEADPHONES
*HEADPHONE & SPEAKER CORDS
*ANT, RF, OSC, IF COILS
*SPEAKER GRILL CLOTH
*PILOT LAMPS
*XTAL SET PARTS

AND MUCH, MUCH MORE. ALSO, AS A CONVENIENCE TO YOU, WE CAN EVEN PROVIDE COPIES OF THOSE EVER POPULAR BOOKS "VINTAGE RADIO & FLICK OF THE SWITCH" IN SOFT COVERS. SCHEMATICS OF MANY VINTAGE RADIOS AND TV SETS ARE ALSO AVAILABLE. FOR FREE FLYER SEND SASE TO OLDE TYME RADIO COMPANY, 2445 LYTTONSVILLE ROAD, SILVER SPRING, MD.

WISH TO REACH US BY PHONE? THE NUMBER IS 301-585-8775. PLEASE CALL BETWEEN 7:00 AND 11:30 PM LOCAL TIME ANY DAY OF THE WEEK.

****
"AK-4700- MINT IN ORIGINAL shipping box. Floyd Paul, 1545 Raymond, Glendale, CA 91201"
****
CROSLEY REDWOOD MINI CONSOLE $95.00 -- book available on French Philips radios, ppd, $15.00 each. covers 1928-1948. Richard Foster, 12 Shawmut Avenue, Cochituate, MA 01778
****
FOR SALE; USED TUBES, NEW AND USED radio and TV parts, send S.A.S.E. for lists. Elmer Nelson, 11 S. Church Street, Princeton, IL 61356.
****
MAGIC EYE TUBES (6U5/6G5). BRAND NEW IN CARTONS FOR $15.00 PLUS POSTAGE. OLD RADIO HOSPITAL; P. O. BOX 31555; HOUSTON, TX 77235. (713) 723-4254 AFTER 6 P.M.
****
NATIONAL FBX (fair) $35.00 -- RCA ACR-136 commercial receiver works $45.00 -- Hallicrafters S-38 works $30.00 -- Nameless AM/FM tuner c.1948 $25.00 -- Philco 39-116 w/remote works $85.00 -- GE G-106 beautiful, remote control, console (no ship) $100.00. Shipping extra. Calls 6-9 p.m. est) (617) 655-2056
****
FOR SALE: TRANSMITTER TUBES 813 etc. Send S.A.S.E. for list. Wanted speaker for Freshman Masterpiece, cabinet model. Marion Van Hal, 1328 Orchard Drive, Pella, IA 50219
****
GET THOSE AUDIO TRANSFORMERS, CHOKES, HORN DRIVERS, HEAD SETS REPAIRED. ONLY $4.50 EACH PART. MANY SATISFIED CUSTOMERS. 100 % GUARANTEED. USING THE VER IMPROVING HIGH VOLTAGE SHOCK TREATMENT. ONLY TWO FAILURES TO DATE. MANY WIRE WOUND RESISTORS SAVED. SAVE THOSE ORIGINAL PARTS. OLDEN YEAR MUSICAL MUSEUM, BOX 3442, ARLINGTON, TX 76014. (214) 298-5587.
****
M4-MAGNAVOX HORN, NO BASE $12.00 -- CLOUGH BRENDEL SIGNAL GENERATOR $30.00 -- OLD BAKELITE RADIOS, OUR CHOICE, $8.00 EACH. WANTED: 01A TUBES, GOOD FILAMENTS, LOW PRICE, JOHN MARTIN, 817 COOK AVENUE. BILLINGS, MT 59101
****
PARAGON RA-10. BEAUTIFUL SET. $650.00; Trav-ler portable, loop antenna in lid. Cute. Works on local stations. five good '99s. $165.00; Radiola III, fair $65.00; National 1-10, tubes and all coils. $110.00; Western Electric 549 cone speaker. $50.00; Radiola 1325 horn speaker $50.00; Paul C. Crum, 6272 N. Cicero Avenue, Chicago, IL 60646.
****
****
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WANTED: Philco 118, AK cathedrals.
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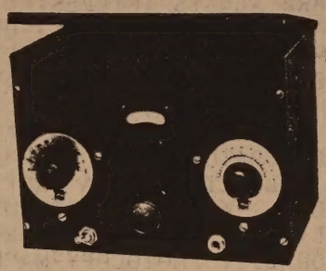
WANTED



WANTED: THIS THREE TUBE BATTERY RECEIVER using plug- in coils, sold by Jerry's Place Gross Radio 1935. Also need schematic, layout, other data for "Elgin" Super Reinartz kit set. Have chassis, need original detector and case for Radiola I made by General Electric. Ed Pompea, 2111 Trent, Colorado Springs, CO 80909.

RIDERS VOL. XXII AND XXIII, BOB NICHOLSON, 3423 LONG, TOPEKA, KS 66605. (913) 266-9473.

INSTRUCTION MANUAL FOR SUPREME ANALYZER MODEL 333. ORIGINAL OR PHOTO COPY. WRITE GERALD WEISS, N-89 W- 16229 MAIN STREET, MENOMONEE FALLS, WI 53051

GRANDFATHER CLOCK RADIOS, CATHEDRAL SHAPED RADIOS, SOCKET HOLDING BRACKET FOR FEDERAL 61, TUBE COVER FOR RADIOLA 26, SEND PICTURE AND PRICE OF RADIOS IN FIRST LETTER. LEE WILLIAMS, 22026 3 PL WEST, BOTHELL, WA 98011.

HALLICRAFTERS $$$ Serious Collector needs Hallicrafter and other Ham equipment manufactured before 1940 for restoration and eventual museum exhibit. Need Hallicrafters, National, Hammarlund, Patterson, RCA, RME, Grebe, etc. Condition not important. Also need QST magazines Volumes I and II and old tubes. All letters answered. Write Dave Medley, 6621 Duffield Drive, Dallas, Texas 75248, WA5YXA

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EMERSON RADIO COLLECTOR seeks 10" wooden cased early Emerson TV as well as unusual table radios and radio phonographs. Ray Miller, Box 1711, Oceanside, CA 92054.

WANTED: CONDENSERS .001, .005, and .05 for early TV sets at 6 KV. Pilot Super Wasp 1932, pictured on top of page 9, April 1983. Vaughn Rudisill, 222-22 Edmore Avenue, Queens Village, NY 11428.

WANTED: WESTERN ELECTRIC audio products, Marantz and McIntosh tube audio equipment, surplus tubes and anything related. Contact Charles Dripps, 4331 Maxson Road, El Monte, CA 91732 (213) 444-7079

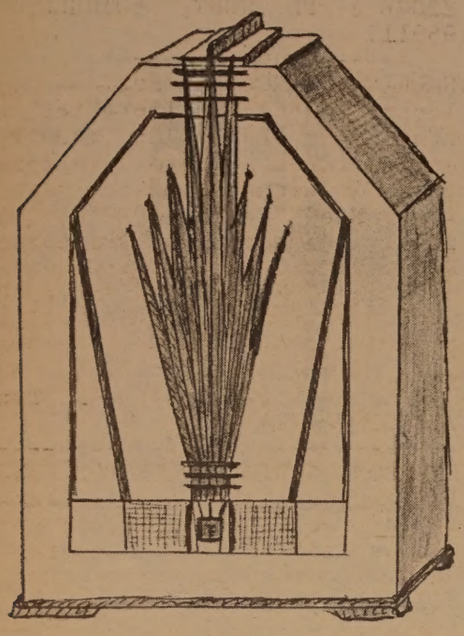
PACENT PHONOVOX magnetic Hi Imp. phono pickup from 1930's Horizontal magnetic. KAELBER, Box 3335, Spring Hill, FL 33526.

PORTABLES WANTED: 1920s suitcase, box camera type and other unusual portables. Also want early AC sets that are unusual (Kellogg tube sets, battery set conversions, etc.) and fancy horn speakers. I also need base for Music Master horn. Mel Rosenthal, 507 South Maryland Avenue, Wilmington, DE 19804. (302) 994-0874 (8-10 p.m.dst)

WANTED: BROWN PLASTIC ESCUTCHEON for model 40 - 150 Philco table model. Page 127 of "Flick of the Switch", 1930-50, in foreground. Glenn Martin, 1005

Reid, Houston, TX 77022 (713) 699 1600

WANTED: 7 UX-199'S AND 1 UX-120. Also need RCA Service Manuals for Radiola 30 and 60. Jim Conaway, 709 Halstead Road, Wilmington, DE 19803 (302) 478-5815.



"DO YOU KNOW ANY RADIO THAT LOOKS LIKE THE ABOVE DRAWING? NEED MAKE AND MODEL." Contact Fred Greer, 6042 Brookridge Road, Jacksonville, FL 32210 or phone (904) 771-7828.

WANTED: AK HORNS, AK LITERATURE, AK MODELS 9, 50 55, AND 60. WRITE JERRY WILSON, 1475 MOSSLINE DRIVE, JACKSON, MS 39211

DECO AND MIRRORED GLASS RADIOS WANTED BY AVID COLLECTOR. finder fees paid for positive acquisition leads regardless of condition. May consider swapping rare Kennedy 311/522 portable for a peach or green mirrored glass radio. All letters answered. Ed Sage, 1781 Helane Court, Benicia, CA 94510. Phone: (707) 746-5659 anytime.

WANTED: WILL BUY OR TRADE FOR VT24/864 radio tubes. We specialize in the repair of small radios made between 1928 and 1942, 50 years experience. James Fred, Cutler, IN 46920. Phone (317) 268-2214.

WANTED: 21 INCH OAK OR MAHOGANY MUSIC MASTER BELL. CONDITION NOT IMPORTANT. CHARLIE STEWART, 900 GRANDVIEW AVENUE, RENO, NV 89503

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PORTABLES WANTED: 1920s suitcase, box camera type and other unusual portables. Also want early AC sets that are unusual (Kellogg tube sets, battery set conversions, etc.) and fancy horn speakers. I also need base for Music Master horn. Mel Rosenthal, 507 South Maryland Avenue, Wilmington, DE 19804. (302) 994-0874 (8-10 p.m.dst)

WANTED: BROWN PLASTIC ESCUTCHEON for model 40 - 150 Philco table model. Page 127 of "Flick of the Switch", 1930-50, in foreground. Glenn Martin, 1005 Reid, Houston, TX 77022 (713) 699 1600

WANTED: ATWATER KENT CONDENSERS variable, detector and amplifier tube panel and filament control and switch panel. William L. Compton, 11 Harbor Woods Drive, Clearwater, FL 33519.

WANTED: SCOTT COIL SHEILD CANS (late copper type). Musicmaster radio in deluxe cabinet; Philco Pup radio. Dick Howe, 9318 Wickford, houston, TX 77024.

WANTED: 1 TUBE SETS, CRYSTAL SETS, GREBE CR EQUIPMENT. RAY GARNER, ROUTE 1, BOX 320, BIG SANDY, TN 38221.

RCA VICTROLA CREDENZA 8-30. EDISON OPERA. HMV 202, 203. Western Electric tubes, amps, mixers, consoles, networks, drivers, tweeters, horns, speakers, parts. Tel: (213) 576-2642. David Yo, POB 832, Monterey Park, CA 91754.

WANTED: EARLY BATTERY RADIO PARTS, ALSO JUNKER PANELS/ BASEBOARDS FOR STRIPPING. BROKEN PANELS OK, BUT DO NOT WANT ANY CABINETS. SEND LIST AND PRICES TO: BOB, W6ME, 4178 CHASIN STREET, OCEANSIDE, CA 92056

RCA RADIOLA BATTERY SET (1922 to 1926 era) with speaker horn, complete. STEVE LEHTO, 857 SYDNOR, CAMPBELL, CA 95008.

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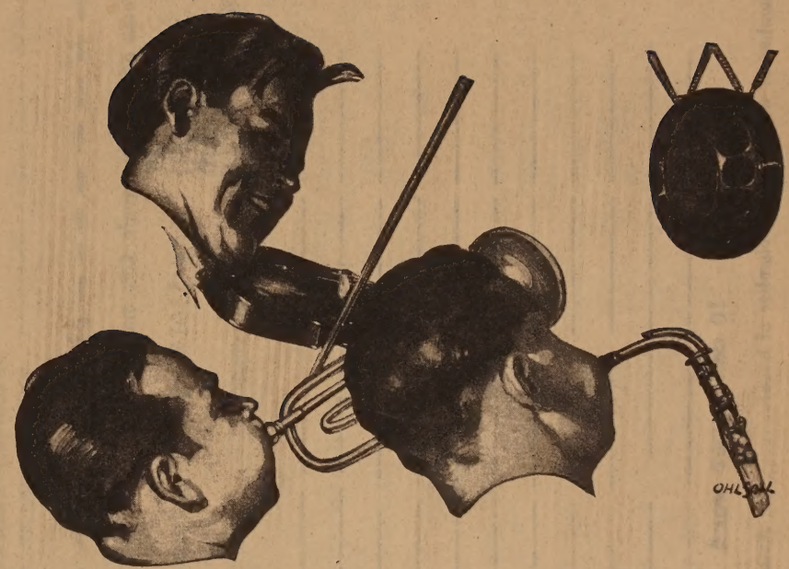

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